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## 6. MEASURING EFFECTS

### OVERVIEW

In Section 4, we provided an overview of how to select metrics for monitoring implementation progress. This section provides additional detail on metric selection and offers some guidance about setting up monitoring systems at your MTF.

*Assessing your implementation efforts requires appropriate data and careful interpretation.*

To monitor and assess the effect of your guideline implementation efforts you need to:

- choose appropriate metrics,
- collect data, and
- interpret your results.

Each of these topics is covered in general terms. Then two specific examples of metric selection and use are presented to help make these methods more concrete for you to use on an ongoing basis.

### CHOOSE APPROPRIATE METRICS

#### The DoD/VA Guideline Metrics

The DoD and VA already have in place a process for developing guideline metrics. The DoD/VA metrics are selected by an expert panel of clinicians using a Delphi consensus development process. High-priority indicators have been selected to be monitored on a service-wide basis. The expert panels also have identified additional metrics that they suggest for use by individual services or MTFs.

*When selecting metrics, consider the type and importance of the outcome, and the feasibility and interpretability of the measure.*

The guideline metrics developed by the DoD/VA expert panels for low back pain, asthma, and diabetes are provided in Appendix H. You are strongly encouraged to select from among the other metrics provided for monitoring guideline implementation at your MTF. Doing so will make

metric selection easier for you and give you confidence that you are using valid measures.

### **Selection Criteria**

The following criteria will help you choose your metrics:

- **Processes, utilization, and outcomes:** Process measures (e.g., document form in chart, new patient education encounters) are particularly useful in the early stages of implementation to assess whether the actions specified in the Action Plan are actually taking place. Utilization measures (e.g., referrals, diagnostics, procedures, etc.) are useful for charting changes in access to care and costs of care. Finally, changes in patient outcomes (e.g., duty days lost, blood pressure levels) are excellent measures of the impact of guidelines on quality of care.
- **Importance of factor being measured:** The measures you choose must capture the key elements of the guideline, particularly those for which you have defined specific actions in your implementation plan.
- **Ability to interpret and act on findings:** It is sometimes difficult to determine if an increase or decrease in a certain indicator (e.g., trend in referrals, imaging studies, or drug use) is a result of successful guideline implementation or an undesired outcome. This ambiguity often results from insufficient information about whether such changes are “appropriate” from a clinical perspective. We explore this issue below under “Interpreting results.”
- **Feasibility of measurement:** The easiest and least costly ways of collecting data are to use data from existing automated information systems or to add new data elements to these systems. If needed data are not available from these sources, then chart abstractions, surveys, new administrative forms, or special outcomes studies can be used. However, such studies are more resource intensive and are often more vulnerable to incomplete documentation.

- **Identifiable and measurable denominators:** It is important to have complete counts of relevant patient populations (e.g., all adult type-2 diabetic patients) in order to produce accurate reports of chosen indicators (e.g., % type-2 diabetics with adequate glycemic control).



#### Field Note

*Diabetes Demonstration: Several MTFs defined measures to check whether they were actually making the system changes they intended. For example, one MTF has a measure to monitor whether providers are checking patients' feet as indicated, and another is monitoring the completeness of patient education activities.*



#### Field Note

*LBP Demonstration: One MTF is monitoring closely the impact of the LBP guideline on use of MRIs. Because the MTF does not have MRI, it must pay for each procedure. There was concern that MRI use (and cost) might increase.*



#### Field Note

*Asthma Demonstration: One MTF used pharmacy data to monitor asthmatics use of bronchodilators and anti-inflammatory medications. Patients who were relying on quick relief medications, rather than regularly using anti-inflammatory meds, were good candidates for further patient education.*

## COLLECT DATA

### Methods for Monitoring Implementation

Once you have chosen your metrics, the next task is to put implementation monitoring systems in place at your MTF. There are two basic methods for collecting data to monitor your chosen metrics.

*Monitoring relies on the results of special studies and data from automated systems.*

- **Routine monitoring of administrative data,** which usually come from an MTFs' automated information systems, include enrollment records, encounter records for outpatient visits, inpatient stays, prescription drugs, and use of ancillary services (such as laboratory, radiology, physical therapy, and other diagnostic or therapeutic services). Encounter data provide timely feedback for

treatment facilities to guide implementation actions and for monitoring performance systemwide. However, these data are less useful for measuring outcomes of care because they do not contain information about a patient's clinical status. Moreover, measures of the quantity and timing of services based on these data may be interpreted incorrectly if not used in conjunction with data on patient status or clinical judgments made when care is delivered.

- **Special studies of clinical data**, which collect information recorded in patients' medical charts or reported by patients in surveys, produce rich detail about the patients' clinical status (such as level of back pain or physical function) and clinicians' assessments of required interventions. However, because these studies are time consuming and costly, they cannot be used to generate data on a routine basis (e.g., monthly or quarterly). Therefore, they are not very useful for timely monitoring of compliance with the guideline and its effects on service delivery profiles.

Given their respective strengths and weaknesses, these two monitoring techniques complement each other well, and should be used in combination. It is important to note that despite the more labor-intensive nature of special studies, these studies will vary in scope and complexity depending on the objective at hand. You may decide to manually pull 10-20 charts to answer a few specific questions about the process of implementation at your MTF. More elaborate special studies may be conducted by analyzing data from administrative data systems.



*All Three Demonstrations: Several MTFs found it hard to gain the buy-in of clinical staff because they had not collected simple data on MTF performance relative to the contents of the guideline. Unless you can produce hard data to the contrary, clinicians will often assume that the guideline represents current practice at the MTF.*

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## Data Sources

A number of data sources are available for both special studies and routine monitoring. Each source has strengths and weaknesses, which we summarize in Table 6.1 and describe below.

- **Encounter data (e.g., CHCS, ADS):** These computerized data are easy and inexpensive to obtain. Administrative data on service utilization usually contain diagnosis and procedure codes. However, different codes can be used to describe the same event and the accuracy and completeness of coding are not always consistent. Using administrative data also limits you to the information that the computerized systems already collect, unless you can add desired data elements to the systems.
- **Enrollment data (e.g., DEERS):** Enrollment data have the advantage of providing information about the entire population of patients served by your MTF. These data can be particularly useful for determining the incidence or prevalence of health conditions and service use rates in the patient population at a whole, or in subgroups. However, enrollment data may be missing information on particular factors of interest (e.g. health status, chronic health conditions), and these data may not be routinely updated.
- **Patient management/documentation forms:** These forms provide patient-level data specific to the guideline(s) being implemented. In addition to being a good source of data on implementation, they also act as a reminder for clinicians. However, unless clinic staff believe that the benefits of documentation forms outweigh the added time burden of filling them out, staff will resist using them.

*Useful data sources include: patient charts and documentation forms, surveys, and administrative and enrollment information.*

**Table 6.1: Advantages and Disadvantages of Data Collection Methods**

<b><i>Data Collection Method</i></b>	<b><i>Advantages</i></b>	<b><i>Disadvantages</i></b>
Administrative data: Encounter data	Low cost; readily available	Inconsistent coding, data not available for many measures
Enrollment data	Provide data on entire patient population	Data not available for many measures of interest; data may not be regularly updated
Special study data: Patient management sheet (documentation form)	Guideline-specific data; provider reminder	Incomplete data if forms not completed for all patients
Chart abstraction	Detailed clinical data on appropriateness and outcomes of care	Costly; time intensive
Patient surveys	Capture patient perceptions of guideline implementation and health status	Costly; time intensive; one point in time; uncertainty about patient perceptions

- Chart abstraction:** Because the patient chart contains detailed diagnostic information, it can be used to determine the appropriateness of care, the quality of care, clinical outcomes, and the access of certain groups to specific types of care. Abstracting data from medical charts is time consuming and costly. Missing charts can make results inaccurate because available charts may not be representative of the total patient population. Because chart data lacks a standard format, some information may be missing. In addition, the way data are recorded may vary (e.g., no mention of smoking may mean that the patient does not smoke or that the physician did not ask whether the patient smokes). You should consider these limitations when interpreting the data (see below).

- **Patient surveys:** Patient surveys can be used to collect data on patient satisfaction with care, functional and health status, quality of life and health habits. Patient surveys can also capture patients' perceptions of guideline implementation. If you cannot survey all of the patients you are interested in, you can use random samples of those patients to obtain information that is representative of the population. Low response rates or poor recall by respondents can make data difficult to interpret. Also, surveys only capture one point in time, and they must be repeated periodically to provide trend data.



#### Field Note

*Diabetes Demonstration: One MTF, with MEDCOM support, established an automated information retrieval mechanism to assist in disease management and metrics monitoring.*



#### Field Note

*All Three Demonstrations: The MTFs and MEDCOM agreed to use the same diagnostic code(s) on ADS sheets to identify patients treated under each guideline, so that monitoring can be done consistently. Standard codes have been identified for LBP and asthma. Work on diabetes codes is in progress. Multiple codes still must be used to identify patients for historical service use.*

### Frequency of Data Collection

Deciding how frequently to collect data is an important component of your monitoring strategy. Your action team should consider three aspects of the monitoring process:

- Early monitoring of changes to clinical practices
- Monitoring administrative data
- Conducting special studies

*Collect process data early and frequently; monitor administrative data monthly; conduct special studies strategically.*

During the early weeks of implementation, it will be useful to collect data on a small scale for indicators that show whether the changes in practice that you intend to make are actually occurring. For example, you could pull a sample of 10-15 charts for asthma patients in one or more

clinics to check what percentage of those charts document asthma severity. These checks should be carried out relatively frequently at first, phasing out to longer term monitoring over the first year.

Because administrative data are usually readily accessible, we suggest that your action team monitor these measures on a monthly basis, checking the data for desired or undesired changes in utilization. This schedule will allow the team to respond quickly to refine your implementation strategy as needed. Quarterly reports can be made to Command on implementation progress, impacts on service use, and resulting changes made to your implementation strategy.

Special studies, by their very nature, provide retrospective data, rather than "real time" data on measures of interest. Because of the cost of special studies, they are performed infrequently, so you will be able to observe trends only after several years of data collection. For these reasons, special studies must be carefully designed so that each will yield as much data as possible on multiple measures. For example, a patient survey will provide data on many aspects of care. However, you might conduct the survey only once every year or two.

## INTERPRET YOUR RESULTS

*When interpreting results, pay attention to the direction of cause, and to the effects of subjective or missing data.*

To turn the data you have collected into information about implementation progress, you must analyze and report the data in a way that is useful to MTF leadership and to clinical staff.

### Data Analysis

There are several issues to keep in mind when you analyze your data.

- **Causal direction:** Guideline implementation can lead to either increases or decreases in rates of referrals, prescription, etc. For example, an expected decline in referral rates due to better primary care management of a disease may actually increase referrals because of better

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diagnostics. An increase or a decrease in a measure should not be considered either good or bad until you have thoroughly considered alternative interpretations.

- **Subjectivity:** Raw numbers of procedures, prescriptions, referrals, etc. will not tell you whether these were “appropriate” courses of action. Such determinations will require the judgment of experienced clinicians.
- **Missing data:** Missing data can lead to erroneous conclusions in many ways. For example, if you are calculating rates or percentages, and you do not have counts of the whole population of interest, your rates will be inflated. If you conduct a survey and you are missing data because many subjects did not respond, your results may not reflect your original population of interest. If you rely on patient management sheets for much of your monitoring data and these sheets are used inconsistently, your measures will be invalid.

### Data Reporting

The “best” methods to display monitoring data are the ones that work for your implementation team, MTF leadership, and other users. Some people find tables to be an effective way to communicate information; others prefer graphs. However, two principles apply to all methods of data display:

- Display only the most important information from your analyses to succinctly “tell the story” that emerged, and
- Keep each table or graphic simple so users can find the important information easily.

Although you are reporting the same results to all users of the monitoring information, each type of user will be interested in different aspects of the information. We use MTF leadership and individual physicians as examples for this discussion because they are two of the most important groups of users. However, you may use different reporting formats for other groups, such as front-line nurses, other clinical staff, or support staff.

*To report findings, use simple graphics, brief summaries, and specific recommendations.*

*Report formats should reflect users' needs.*

- **Reports for MTF Command:** Monitoring reports prepared for the MTF leadership should follow the same principles used for other management reports—a succinct presentation that summarizes the key findings, highlights the implications of those findings, and discusses recommendations for action. Additional detail can be provided upon request. Data display issues (discussed above) are especially pertinent for management reports. Use of graphics can present comparative information on indicator performance quite effectively, either across MTFs or over time.
- **Reporting to physicians:** Reports to physicians should emphasize collaboration and educational feedback, and where appropriate, should encourage physicians to change practices. In addition, written documents need to protect the confidentiality of individual physicians. One approach is to prepare a separate, confidential report for each physician comparing his/her performance to that of all other physicians in the clinic or MTF. The data should be presented at a level of detail that shows the physician clearly which practices should be changed to improve performance on the monitoring indicators.

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### Example 1: MONITORING IMPLEMENTATION OF THE LOW BACK PAIN GUIDELINE

<b>Metrics</b>	An MTF decides to monitor the percentage of new LBP patients receiving a neurological exam during the initial clinic visit.
<b>Data Collection</b>	If Army MEDCOM Test Form 695-R (a two-page LBP documentation form for the medical chart) is completed for all patients and always included in the chart, then this is a valid source of data for this metric. Special care must be taken to ensure that all clinicians are familiar with the form and agree to use it. Periodic spot checks should be made to ensure that Form 695-R is placed in all LBP charts. In order to determine the entire population of new LBP patients at the MTF, standardized coding of the condition must be agreed upon for the CHCS database. Once the population of new LBP patients is determined, all of the charts, or a random sample of them must be pulled to determine those who received a neurological exam. Missing charts can bias results, so care must be taken to find all of them.
<b>Results</b>	Results should be reported for a specific time period (i.e., new patients in first six months since introduction of the guideline). Also, choose a benchmark against which you will measure your progress. Present a report of your findings to the MTF leadership and physicians. If you fall short of your benchmark, recommend actions for improvement. If you meet your benchmark, state your plan for continued periodic monitoring.

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**Example 2: MONITORING IMPLEMENTATION OF THE ASTHMA GUIDELINE**

<b>Metrics</b>	During their planning process, an MTF discovered they are inconsistent in prescribing long term controllers for patients with persistent asthma. They develop a planned action in this area. To monitor their progress, they decide to measure the percentage of patients for whom controllers are prescribed.
<b>Data Collection</b>	The only way to collect truly valid data for this metric is through special studies. To determine the denominator for the percentage estimate, you must first define “persistent asthma.” Then you need to pull all the charts (or a random sample of them) for patients with asthma to determine persistent cases. Prescriptions for long-term controllers are probably noted in the chart, but may need to be verified with more consistent formulary data.
<b>Results</b>	When reporting prescription rates, be sure that the population of patients with persistent asthma has been properly identified and that your data on prescriptions is valid and complete. Choose a benchmark against which you will measure your progress. Present a report of your findings to the MTF leadership and physicians. If you fall short of your benchmark, recommend actions for improvement. If you meet your benchmark, state your plan for continued periodic monitoring.